

to the Letter-Invitation No. dated

International project
**“Raising Knowledge among Students and Teachers on Tailings
Safety and its Legislative Review in Ukraine“***

PROGRAM
First Training

3–7 October 2016
Dnipro, Ukraine

Venue: National Mining University, D. Yavornitsky Av., 19

I. Training objectives are

- to educate students in the safety of tailings in the context of global experience, European standards and Ukrainian practice;
- to train the students of participating universities how to practically apply the TMF Methodology;
- to prepare tutors for further teaching of the TMF Methodology;
- to test the TMF Methodology and the developed education course; and
- to improve the educational materials and means.

II. Meeting timetable

1st day, October 3, 2016

| Greeting the participants and project introduction Chairman: Mr. Dmytro Rudakov Secretary: Ms. Ganna Zadnipriana | |
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| 10:00 – 10:10 | Acad. Gennadiy Pivnyak, Rector of National Mining University – Official opening |
| 10:10 – 10:15 | Mr. Gerhard Winkelmann-Oei – Welcoming remarks |
| 10:15 – 10:20 | The representative of Ministry of Ecology and Natural Resources of Ukraine – Welcoming remarks |
| 10:20 – 10:25 | The representative of Ministry of Education and Science of Ukraine – Welcoming remarks |
| 10:25 – 10:35 | Ms. Iryna Nikolaieva – Presentation of the previous TMF project results as a basis for raising knowledge on TMF safety |

*This project is funded by the German Federal Environment Ministry's Advisory Assistance Programme (AAP) for environmental protection in the countries of Central and Eastern Europe, the Caucasus and Central Asia and other countries neighbouring the European Union. It is supervised by the German Environment Agency (UBA).

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| 10:35 – 10:45 | Mr. Dmytro Rudakov – Project & Training objectives, introduction of training participants |
| 10:45 – 11:00 | Mr. Grygorii Shmatkov – Significance of the TMF problem for Ukraine and importance of the education course on TMF safety |
| 11:00 – 11:15 | Ms. Tetiana Zavgorodnia – DTEK practical experience in tailings management and TMF inspection |
| 11:15 – 11:30 | Ms. Tatiana Omelyanenko – TMF safety within the implementation of Directive 2006/21/EC |
| 11.30 – 12:00 | Coffee Break |
| | The UNECE Strategy for TMF problems |
| 12:00 – 12:15 | Ms. Claudia Kamke – The UNECE “Convention on the Transboundary Effects of Industrial Accidents” and “Water Convention“. Brief introduction of the JEG. UNECE online course on industrial accidents |
| 12.15 – 12.30 | Mr. Gerhard Winkelmann-Oei – The JEG strategy for Risk Management |
| 12.30 – 13.00 | TMF-related Problems in UNECE Countries - (Kazakhstan, Belarus, Serbia) Mr. Serik Akhmetov - TMF-related Problems in UNECE Countries- Kazakhstan Ms. Lubov Hertman - The EIA as a mayor tool for Safety of TMF <i>Proposed themes:</i> <i>Serbia - relevant topic in this regard</i> |
| 13.00 – 14:00 | Lunch |
| Significance of the TMF problem and world experience Chairman: Mr. Gerhard Winkelmann-Oei | |
| 14:00 – 14:15 | Mr. Philip Peck – Experience with TMFs in the UNECE region. How can the TMF Methodology improve the situation (by Skype) |
| 14:15 – 14:30 | Mr. Wolfhart Pohl – Walkover surveys in the TMF field or Global field experience with TMFs in relation to TMF Methodology (by Skype) |
| 14:30 – 14:45 | Mr. Zoltán Török – Experience with TMFs in Romania; prospects of the THI method application |
| 14:45 – 15:00 | Adam Kovacs – Lessons Learned in Hungary on TMF red mud disaster in Kolontar for the Danube River Catchment, ICPDR action plan on TMF issues |
| 15:00 – 15:15 | Mr. Konstantin Burjanadze – Experience of Georgian competent authorities in addressing the TMF problem |
| 15:15 – 15:30 | Ms. Kristina Sahakyan – Armenian situation on the TMFs’ operation |
| 15:30 – 16:00 | Coffee Break |

| TMF Regulatory aspects Chair: Mr. Grygorii Shmatkov | |
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| 16:00 – 16:15 | Mr. Dmytro Rudakov – Review of the documents regulating the TMFs in different countries of the world. UNECE Guidelines for tailings safety |
| 16:15 – 16:30 | Ms. Tetiana Omelyanenko – The current legislative situation on TMFs in Ukraine – comparative analysis of Ukrainian and European legislation on TMF issues |
| 16:30 – 16:45 | Mr. Sergii Chumachenko – Review of the approaches to evaluate the safety of hazardous sites |
| 16:45 – 17:00 | Ms. Kateryna Okhotnyk – Method of evaluation of the "Tailings Hazard Index" as a tool for state management, Ukrainian TMFs Database; mapping of TMF sites |
| 17:00 – 17:30 | Discussion and closing remarks |
| 20:00 | Friendly Dinner |

2nd day, October 4, 2016

JEG Meeting, 10:00 - 13:00 (in parallel with training)

| Theoretical part of training Introduction to the TMF Checklist method | |
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| Chair: Mr. Grygorii Shmatkov | |
| 10:00 – 10:15 | Ms. Iryna Nikolaieva – Introduction of training participants: trainers, tutors, trainees, experts |
| 10:15 – 10:30 | Mr. Dmytro Rudakov – Introduction of the training activities; Content of the education course |
| 10:30 – 10:40 | Ms. Kateryna Okhotnyk – Print and e-form materials for using within the training |
| 10:40 – 11:00 | Ms. Tetiana Zavgorodnya – Description of the TMF site to be tested: enterprise history, technology, TMF infrastructure |
| 11:00 – 11:30 | Coffee Break |
| Chair: Ms. Iryna Nikolaieva | |
| 11:30 – 11:45 | Mr. Dmytro Rudakov – TMF Checklist structure. Review of questions in the TMF Checklist (Document check and Visual inspection groups) |
| 11:45 – 12:00 | Mr. Dmytro Rudakov – Evaluation Matrix, overall and categorial evaluation of the TMF safety level |
| 12:00 – 12:15 | Mr. Dmytro Rudakov – Measure Catalogue, the use of Best Available Techniques |
| 12:15 – 12:30 | Ms. Kateryna Okhotnyk – MS Excel template of the TMF Checklist |
| 12:30 – 13:00 | Q & A |

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| 13:00 – 14:00 | Lunch |
| Chair: Mr. Dmytro Rudakov | |
| 14:00 – 14:10 | Ms. Iryna Nikolaieva – The procedure of TMF Checklist application |
| 14:10 – 14:20 | Ms. Iryna Nikolaieva – Reporting procedures and templates |
| 14:20 – 14:40 | Ms. Iryna Nikolaieva – “CL’s Question and Answer”: requirements of legal documents as criteria for questions, accurate information as proof of answers; examples – live discussion with trainees |
| 14:40 – 15:00 | Ms. Kateryna Okhotnyk – The procedure and order of applying of the TMF Checklist template in MS Excel; exercises on computers |
| 15:00 – 15:15 | Q & A |
| 15:15 – 15:45 | Coffee Break |
| Chair: Ms. Kateryna Okhotnyk | |
| 15:45 – 16:00 | Mr. Grygorii Shmatkov – Types of different TMFs in Ukraine, its features and characteristics |
| 16:00 – 16:15 | Ms. Tetiana Zavgorodnia – Review of the TMF Summary prepared for training needs |
| 16:15 – 16:30 | Ms. Iryna Nikolaieva – Walkover survey on the field, procedure and the main focus points |
| 16:30 – 17:00 | Summary of the 2 nd training day. Brief instructions for the TMF site visit next day |

3rd day, October 5, 2016

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| Practical part of training Site-visit to the Prydniprovsk TPP Chair: Mr. Grygorii Shmatkov | |
| 09:30 | Meeting in the hotel hall |
| 09:30 – 10:00 | Transfer to the Prydniprovsk TPP of PJSC DTEK Dniproenergo |
| 10:00 – 10:30 | Arrival and passing formalities, photos, getting safety instructions |
| 10:30 – 11:00 | Meeting with company’s management |
| 11:00 – 11:30 | Coffee Break |
| 11:30 – 12:00 | Shift of clothes, photos, departure to the TMF site |
| 12:00 – 13:30 | Tour of the enterprise, introduction to technological process |
| 13:30 – 14:30 | Lunch |
| 14:30 – 16:30 | Visiting the TMF site (4 groups on different TMF parts) |
| 16:30 – 17:00 | Closing meeting at the company office, shift of clothes |
| 17:00 – 17:30 | Return to the city |

4th day, October 6, 2016

| Classroom work - Safety evaluation of the TMF tested | |
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| Chair: Ms. Iryna Nikolaieva | |
| 10:00 – 10:30 | Discussion on TMF site visit results by trainers, tutors, and trainees |
| 10:30 – 11:30 | Filling in the TMF Checklist – question group “Detailed visual inspection” based on the site visit results. Tutors, trainees |
| 11:30 – 12:00 | Coffee Break |
| 12:00 – 13:15 | Continuation of filling in the TMF Checklist - question group “Detailed visual inspection” using documentation provided by the TMF operator (TMF Summary prepared for training’s needs). Tutors, trainees |
| 13:15 – 13:30 | Discussion |
| 13.30 – 14.30 | Lunch |
| Chair: Mr. Dmytro Rudakov | |
| 14:30 – 15:15 | Selection of the measures from Measure Catalogue |
| 15:15 – 15:50 | The groups of students supervised by tutors prepare presentations on the results of TMF safety level evaluation |
| 15:50 – 16:00 | Discussion |
| 16:00 – 16:30 | Coffee Break |
| 16:30 – 17:30 | Prepare presentations on the results of TMF safety level evaluation |
| 17:30 – 17:50 | Filling the feedback forms by training participants |
| 17:50 – 18:00 | Summary of the 4 th training day |

5th day, October 7, 2016

| Chair: Mr. Dmytro Rudakov | |
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| 10:00 – 10:50 | Presentations of the results of the site visit by four groups of students |
| 10:50 – 11:10 | The students pass the short test in e-form to consolidate their knowledge on the TMF Methodology |
| 11:10 – 11:30 | Discussion of the test results and explanations of typical errors |
| 11:30 – 12:00 | Coffee Break |
| 12:00 – 12:30 | Ms. Kateryna Okhotnyk – Assignment of homework (incl the UNECE on-line course on industrial accidents and TMF site visit results) |
| 12:30 – 13:00 | Review of feedback (suggestions and recommendations) on the TMF Checklist Methodology and educational materials |
| 13:00 – 13:30 | Summary of the training |
| 13:30 – 14:30 | Lunch |

III. Training schedule

| No | Stages | Dates |
|----|---|-------------------------|
| 1 | Sending out invitation letters and the training program to participants by email | 09.09.2016 |
| 2 | Sending out theoretical materials of the education course to training participants for individual study | 19.09.2016 |
| 3 | Sending follow letters with form FF-01 (comments and suggestions) | 27.09.2016 |
| 4 | Classroom work including lectures and practical exercises; generating the report on working at the site | 03.10.2016 – 06.10.2016 |
| 5 | Training review, analysis of participants' feedback. | 07.10.2016 |
| 6 | Elaboration of proposals to improve the education course, reporting. | 10.10.2016 – 14.10.2016 |

IV. List of printed training documents (Russian and English versions)

1. Methodology for Improving TMF Safety.
2. Safety Guidelines and Good Practices for Tailings Management Facilities (UNECE).
3. Feedback form (Form FF-01).

To be continued

V. Training participants

Project coordinator

Mr. Gerhard Winkelmann-Oei – German Environment Agency (UBA), Head of Department, Germany;

Host University

Mr. Gennadiy Pivnyak – Rector of National Mining University, Academician of the National Academy of Science of Ukraine;

Mr. Roman Dychkovskyy – National Mining University, Head of Research Department of NMU, Professor.

International experts

The list will be updated later after participants confirmed.

Ms. Claudia Kamke – United Nations Economic Commission for Europe, Convention on the Transboundary Effects of Industrial Accidents, Associate Environmental Affairs Officer, Switzerland;

Mr. Serik Akhmetov – National Convention Liaison Officer (NCLO), Republic of Kazakhstan;

Ms. Lubov Hertman – Institute for Complex Use of Water Resources, Researcher of the Water Monitoring and Cadastre Department, Belarus;

Mr. Philip Peck – International Institute of Industrial Environmental Economics (IIIEE) at Lund University, Associate Professor, Sweden, participation by Skype;

Mr. Zoltán Török – Research Center for Disaster Management, Faculty of Environmental Science and Engineering, Assistant Professor, chemical engineer, Romania;

Mr. Konstantin Burjanadze – Ministry of Environment and Natural Resources Protection of Georgia, Chief Specialist of Natural and Anthropogenical Hazard management Service, Georgia

Ms. Kristina Sahakyan – NGO "Eco Peace", president of the "Eco Peace" NGO, Armenia;

Ukrainian representatives of competent authorities

The list will be updated later after participants confirmed.

Ministry of Education and Science of Ukraine;

Ministry of Ecology and Natural Resources of Ukraine;

Ministry of Energy and Coal Industry of Ukraine;

State ecological inspection of Ukraine;

Dnipropetrovsk City Council;

Dnipropetrovsk Regional State Administration;

Mr. Sergii Chumachenko – Ukrainian Research Institute of Civil Protection of State Emergency Service of Ukraine, Head of Department of simulation of emergencies of Research Center for Innovative Technologies;

Representatives of TMF operator

Ms. Tetiana Zavgorodnia – DTEK, Environmental Safety Department manager;

Representative of Prydniprovsk Thermal Power Plant of PJSC DTEK Dniproenergo;

Ms. Nadiya Solomatina – PJSC "HIMDIVISION", Environmental Protection Engineer;

Ukrainian project team

Mr. Dmytro Rudakov – Project director, National Mining University of Ukraine, Head of the Department of Hydrogeology and Engineering Geology, Professor;

Mr. Grygorii Shmatkov – Key expert, Trainer, Head of Ecology and Environment Protection Department of Prydniprovsk State Academy of Civil Engineering and Architecture, Director of the Centre of Environment audit and Clean Technologies LLC, Professor;

Ms. Kateryna Okhotnyk – Trainer, Education course developer, PhD;

Ms. Tetiana Omelyanenko – Lawyer (key expert) on competent authorities' strategy, Institute of environmental economics and sustainable development of National Academy of Sciences of Ukraine;

Ms. Iryna Nikolaieva – Project manager, Trainer, Lead ecological auditor, Head of LLC "Ecoplatform";

Ms. Ganna Zadnipriana – Project manager assistant, specialist in Environmental Engineering.

Tutors

Mr. Oleksandr Kovrov – National Mining University, Ecology Department of NMU, Associate Prof., PhD;

Ms. Tetyana Yakovishina – Prydniprov's'ka State Academy of Civil Engineering and Architecture, Associate Professor of Ecology and Environment Protection Department, PhD;
Mr. Sergii Kravtsov – National Metallurgical Academy of Ukraine, the Department of Ecology, Heat-Transfer and Labour protection, Assistant;
Educator from Dniprodzerzhinsk State Technical University.

Trainees (students)

The list will be provided later. Participants will be confirmed.

Brief content of the Education course
(Under construction)

| Module | Lecture | Short lecture content | Lecturer / trainer | Educational work type | Training* |
|--|--|---|-------------------------------|-----------------------------------|------------------------------|
| 1. Review of the tailings management practice in the world | 1.1. International experts' review by countries | The UNECE "Convention on the Transboundary Effects of Industrial Accidents" and "Water Convention". State-of-the-art in tailings safety in the countries represented by the invited experts. Key problems in TMF safety, biggest failures and lessons learned. Global field experience with TMFs in relation to TMF Methodology | International experts | Lecture | 1 st |
| | 1.2. Problems and experience of Ukrainian TMF operation | Significance of the TMF problem for Ukraine and importance of the education course on TMF safety. DTEK practical experience in tailings management and TMF inspection. Types of different TMFs in Ukraine, its features and characteristics. Ukrainian documents and technical standards related to TMF operation. Documents adopted in the countries with developed extracting industries (Canada, the USA, Australia, Great Britain, South Africa, and Finland). Analysis and review. | G. Shmatkov T. Zavgorodnia | Lecture | 1 st |
| | 1.3. UNECE online course on industrial accidents | Introducing information on the course, guidelines and instructions how to pass the course through, the role of the UNECE course in the education course passed by trainees. Assignment of homework including the UNECE on-line course on industrial accidents | K. Okhotnyk | On-line lecture, practices, tests | Homework for 2 nd |
| | 1.4. UNECE safety guidelines and good practices as the legal | Review of the TMF Safety guidelines: objective, scope and applicability, development history, document structure, key sections and principles, basic | D. Rudakov | Lecture | 1 st |

| Module | Lecture | Short lecture content | Lecturer / trainer | Educational work type | Training* |
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| | regulatory base of TMF Checklist development | requirements to TMF safety | | | |
| 2. Legislative regulation of the TMF safety in Ukraine | 2.1. Review of the current legislative situation on TMF in Ukraine | Review of Ukrainian laws, regulatory requirements and guidelines for environmental audit of hazardous industrial sites in terms of Ukraine's course to European integration | T. Omelyanenko | Lecture | 1 st 2 nd |
| | 2.2. Comparative analysis of Ukrainian and European legislation on TMF issues | Similarities and Inconsistencies of Ukraine's legal framework related to TMF compared to EU legislation. Lack of, transparency and ineffective functioning of current Ukraine's TMF legislation | T. Omelyanenko | Lecture | 1 st 2 nd |
| | 2.3. Strategy of competent authorities on TMF issues | The role of Ukrainian responsible ministries and competent authorities in implementation of Directive 2006/21/EC provisions. State-of-the-art and improvement prospects | Experts of MinEcology, MinEnergy T. Omelyanenko | Lecture | 2 nd |
| | 2.4. Action plan on harmonization of Ukrainian TMF legislation with relevant EU laws | Main stages of Action plan agreed with Directive 2006/21/EC provisions. The importance of the TMF Methodology in Directive 2006/21/EC implementation. International significance of the TMF Methodology | Experts of MinEcology, MinEnergy T. Omelyanenko | Lecture | 2 nd |
| 3. The essence and structure of the TMF Methodology | 3.1. THI evaluation method | Definition of Tailings Hazard Index (THI). Basic and extended THI. THI constituents such as capacity, toxicity, tailings management, geological hazards/risks, dam failure criteria | K. Okhotnyk, D. Rudakov | Lecture, tests | 1 st , 2 nd |
| | 3.2. Database of Ukrainian TMFs | Data source and database completeness. Geographical distribution of Ukrainian TMFs. TMF database design and template. Instructions to database users | K. Okhotnyk | Lecture | 1 st , 2 nd |
| | 3.3. TMF Checklist structure and question groups | Question groups of the TMF Checklist: Basic check, Detailed check, Check of inactive sites. The Checklist users and application. Subgroups of question groups. Checklist hierarchy | D. Rudakov | Lecture, tests | 1 st , 2 nd |

| Module | Lecture | Short lecture content | Lecturer / trainer | Educational work type | Training* |
|-------------------------------------|---|--|------------------------------|-----------------------------|-----------------------------------|
| | 3.4. Evaluation matrix and Measure Catalogue of the TMF Checklist | Basic principles of TMF safety level assessment, overall and categorial assessment. The indices “Meeting safety requirements” and “Credibility”. Evaluation methods and examples. The structure and elements of Measure Catalogue. Classification and priorities of measures | D. Rudakov | Lecture, tests | 1 st , 2 nd |
| | 3.5. MS Excel template of the TMF Checklist | Main features and elements of the template, procedure and order of its applying. Instructions how to fill in the e-form of the TMF Checklist | K. Okhotnyk | Lecture, tests | 1 st , 2 nd |
| | 3.6. TMF Checklist application | Development of the TMF evaluation program, information requested for inspection. Familiarization with the TMF to be inspected. Site visit. Templates for reporting | I. Nikolaieva K. Okhotnyk | Lecture, tests | 1 st , 2 nd |
| 4. TMF Checklist method application | 4.1. Visual inspection of TMFs | Trainee breakout to optimize visiting all key TMF elements, forming the trainee groups. Walkover survey on the field, procedure and the main focus points. Filling in the TMF Checklist in paper form | Ukrainian team (trainers) | Practical training | 1 st |
| | 4.2. Document check of TMFs | Check of the documentation provided by the TMF operator. Assessment of its completeness. TMF safety level evaluation and credibility assessment. Filling in the TMF Checklist in spreadsheets | Ukrainian team (trainers) | Practical training | 2 nd |
| | 4.3. Selection of measures from Measure Catalogue | Review of inconsistencies with safety requirements revealed in visual inspection and document check. Selection of the measures recommended in Measure Catalogue | Ukrainian team (trainers) | Practical training | 1 st , 2 nd |
| | 4.4. Procedure of reporting on TMF safety evaluation | Generating the reports on the TMF safety level evaluation based on the results of the site visit and document check. Preparation of the presentations highlighting the results gained by different groups of trainees. Intergroup discussion | I. Nikolaieva, tutors | Lecture, practical training | 2 nd |

* 1st training to be held from 3 to 7 October 2016, 2nd training to be held in the mid of November 2016

Educational materials, documents

1. Methodology for TMF safety improving. Final report. UBA. 2016.
2. Safety guidelines and good practices for tailings management facilities. (2014) UNECE. New York and Geneva, 34 p.
3. Reference Document on Best Available Techniques for Management of Tailings and Waste-Rock in Mining Activities (2009) European Commission, 511 p.
4. Tailing pits and sludge stores. State Construction Norms of Ukraine. ДБН В.2.4-5:2012. Part I. Planning. Part II. Building. (2012) Kyiv, 71 p.

To be continued